



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,132	12/17/2001	Ali Rusta-Sallehy	9351-87 HSF	4158
1059	7590	02/13/2004	EXAMINER	
BERESKIN AND PARR SCOTIA PLAZA 40 KING STREET WEST-SUITE 4000 BOX 401 TORONTO, ON M5H 3Y2 CANADA			RIDLEY, BASIA ANNA	
			ART UNIT	PAPER NUMBER
			1764	
DATE MAILED: 02/13/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/016,132

Applicant(s)

RUSTA-SALLEHY ET AL.

Examiner

Basia Ridley

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 25-31 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-7, 9-11, 14-24, 32 and 33 is/are rejected.
- 7) ☒ Claim(s) 8, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 5, 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-24 and 32-33 in Paper filed on 10 October 2003 is acknowledged. Claims 25-31 and 34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### ***Oath/Declaration***

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing address of each inventor. A mailing address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing address should include the ZIP Code designation. The mailing address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

### ***Information Disclosure Statement***

3. The Information Disclosure Statement filed on 5 September 2003 is a duplicate of Information Disclosure Statement filed on 28 April 2003. Therefore all documents cited on Information Disclosure Statement filed on 5 September 2003 have been considered as part of the Information Disclosure Statement filed on 28 April 2003.

***Specification***

4. The disclosure is objected to because of the following informalities:
- P9/L22-23, "parallel tortuous of open-faced channels" should be replaced with --parallel tortuous open-faced channels--;
  - P11/L18, "distribute the solution and coolant the first reactor plate 200 to (...)" should be replaced with --distribute the solution and coolant from the first reactor plate 200 to (...)--;
  - P13/L1-2, "a solution supply means", both instances, should be replaced with --coolant supply means--.

Appropriate correction is required.

***Drawings***

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "each reaction chamber being in fluid communication with an adjacent one of the plurality of reaction chambers an each coolant chamber being in fluid communication with an adjacent coolant chamber" must be shown, as recited in claim 9, or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "notches 360", as described on page 12, lines 1-2, are not shown in Fig. 8. A proposed drawing correction or

Art Unit: 1764

corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

- "116" and "118" in Fig. 1a;
- "311" in Fig. 6.

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "250" in Fig. 1a has been used to designate, both, a rim and an external wall of reactor stack. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### *Claim Objections*

9. Claim(s) 8 and 12-13 are objected to as being written in improper form because claim 8 is dependent from itself. Accordingly claim(s) 8 and 12-13 have not been further treated on the merits.

10. Claim 33 is objected to because of the following informalities: "the coolant supply" in line 1 should be replaced with --the coolant supply means--. Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claim(s) 1-7, 9-10 and 14-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Lippert et al. (WO 99/64146, English equivalent: US 6,470,569).

Regarding claim 1-7 and 9-10, Lippert et al. discloses a reactor vessel comprising:

- at least one reaction chamber (comprising of channels 3) and at least one coolant chamber (comprising of channels 6), each reaction chamber being configured to receive reactant and to bring at least a portion of said reactant in contact with catalyst (4), each coolant chamber being configured to receive a coolant flow (P3/L7-P5/L21); and
- at least one reactor plate (2a-c) having a first face and a second face in opposing relation with the first face, wherein the first face defines a portion of each reaction chamber and the second face defines a portion of at least one coolant chamber (Fig. 3); wherein
- the first face of each reactor plate defines a reactant flow field and the second face defines a coolant flow field therein (Fig. 3);
- the reactant flow field comprises a plurality of reactant channels (3) and the coolant flow field comprises a plurality of coolant channels (6);
- comprising a catalyst (4) located on at least a portion of the plurality of reactant channels (3);
- wherein the catalyst is in pellet form (P4/L10-13);
- wherein the reactor plate further comprises a reactant inlet and the reactant outlet in the first

Art Unit: 1764

face and in fluid communication with the plurality of the reactant channels, and a coolant inlet and the coolant outlet in the second face and in fluid communication with the plurality of the coolant channels (P3/L7-P5/L21);

- wherein the plurality of the reactant channels extend from the reactant inlet to reactant outlet and the plurality of the coolant channels extend from the coolant inlet to coolant outlet (P3/L7-P5/L21);
- wherein the reactor vessel comprises a plurality of reactor vessel plates (2a-c), and a plurality of separator plates (9) alternating with one another, to define a plurality of reaction chambers alternating with a plurality of coolant chambers, each reaction chamber being in fluid communication with an adjacent one of the plurality of reaction chambers and each coolant chamber being in fluid communication with an adjacent coolant chamber (Fig. 3 and P3/L7-P5/L21).
- wherein each reactor plate defines a reactant inlet port and a reactant outlet port, a coolant inlet port and a coolant outlet port, all formed as openings extending therethrough, and wherein each separator plate includes openings providing inlets and outlets to the coolant and reactant aligned with the reactant and coolant inlet and outlet ports, whereby distribution ducts are formed extending through the reactor plates and separator plates to distribute both the reactant and the coolant to the reaction and coolant chambers and to collect the reactant and coolant from the reaction and coolant chambers (P3/L7-P5/L21).

Regarding limitations recited in claims 1-7 and 9-10 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further

Art Unit: 1764

limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art.

See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as

“configured to receive a hydride solution” do not have patentable weight in an apparatus claim.

See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

Instant claim(s) 1-7 and 9-10 structurally read(s) on reactor vessel of Lippert et al.

Regarding claim 14-21, Lippert et al. discloses a reactor vessel comprising:

- a reaction chamber (comprising of channels 3) and a coolant chamber (comprising of channels 6);
- a first face defining at least a portion of the reaction chamber and an opposing second face defining at least a portion of the reaction chamber (Fig. 3);
- wherein said first face defines a reactant flow field (Fig. 3);
- wherein the solution field comprises a plurality of reactant channels (3);
- further comprising a catalyst (4) located on at least a portion of the plurality of the reactant channels (3);
- wherein the catalyst is in pellet form (P4/L10-13);
- wherein said second face defines a coolant flow field (Fig. 3) having a plurality of coolant channels (6);
- wherein the reactant plate further comprises a reactant inlet and the reactant outlet in the first face and in fluid communication with the plurality of the reactant channels, and a coolant inlet and the coolant outlet in the second face and in fluid communication with the plurality of the



Art Unit: 1764

coolant channels (P3/L7-P5/L21);

- wherein the plurality of the reactant channels extend from the reactant inlet to reactant outlet and the plurality of the coolant channels extend from the coolant inlet to coolant outlet (P3/L7-P5/L21).

Regarding limitations recited in claims 14-21 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as "configured to receive a hydride solution" do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Instant claim(s) 14-21 structurally read(s) on reactor vessel of Lippert et al.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claim(s) 11 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569), as applied to claim 10 above, in view of Ashmed et al. (USP 5,690,763).

Art Unit: 1764

Regarding claim 11, Lippert et al. discloses all of the claim limitations as set forth above. Additionally the reference discloses the reactor vessel wherein the reactor plates and the separator plates are positioned in substantially parallel spaced relationship, thereby forming a stack of the plurality of reactor vessels, and wherein means are provided for joining the reactor plates and the separator plates together, such as welding or soldering (Fig. 3 and P1/L1-16), but the reference does not disclose said means for joining comprising means for clamping.

Ashmed et al. establishes equivalency of clamping, welding and soldering as joining means for a reactor vessel comprising reactor plates (Fig. 1 and C2/L22-33). As instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute means for clamping as the means for joining in the reactor vessel Lippert et al., since such modification would have involved a mere substitution of known equivalent structures. A substitution of known equivalent structures is generally recognized as being within the level of ordinary skill in the art.

15. Claim(s) 22-24 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569), as applied to claim 21 above, in view of Pellegrini et al. (USP 4,217,401) or Godec et al. (USP 6,183,695).

Regarding claims 22-24, Lippert et al. discloses all of the claim limitations as set forth above. Additionally the reference discloses the reactor vessel that appears to be the same as, or an obvious variant of the reactor vessel comprising rectangular reactor plates wherein the reactant inlet and outlet and the coolant inlet and outlet all extend through the plate for forming distribution ducts from a plurality of similar reactor plates stacked together and wherein the reactant channels and the coolant channels are substantially parallel, set forth in the instant

Art Unit: 1764

claims (see Fig. 3, P3/L7-P5/L21 and P6/L11-P7/L8).

While Lippert et al. does not explicitly disclose the reactant inlet and reactant outlet being located proximate to diagonal corners of the reactor plate and the coolant inlet and coolant outlet being located proximate to remaining diagonal corners of said reactor plate, the reference is not limited to any specific arrangement of said inlets and outlets (P3/L7-P5/L21). As rectangular reactor plates wherein the inlets and outlets extend through the plate for forming distribution ducts, said inlets and outlets being located proximate to diagonal corners of the reactor plate and wherein the channels are substantially parallel were well known in the art at the time the invention was made, as evidenced by Pellegrini et al. (Fig. 1) or Godec et al. (Fig. 1), and further, as the instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any arrangement of said coolant inlets and outlets and said reactant inlets and outlets, including inlets and outlets being located proximate to diagonal corners of the reactor plate, in the reactor vessel of Lippert et al. Said combination would amount to use of a known element for its intended use in a known environment to accomplish entirely expected result.

16. Claim(s) 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Jung et al. (USP 3,511,710) or Amendola et al. (USP 6,534,033).

Regarding claim 32, Lippert et al. discloses a reactor vessel comprising:

- a reactant supply means for supplying reactant (P3/L7-P5/L21);
- a coolant supply means for supplying a coolant flow (P3/L7-P5/L21); and
- a reactor vessel (Fig. 3) defining a reaction chamber (comprising of channels 3) and a coolant

Art Unit: 1764

chamber (comprising of channels 6), the reaction chamber being in fluid communication with the reactant supply means, the reaction chamber being configured to bring at least a portion of the reactant received from the reactant supply means in contact with the catalyst (4), the coolant chamber being in fluid communication with the coolant supply means (Fig. 3); and

- at least one reactor plate (2a-c) having a first face and a second face in opposing relation with the first face, wherein the first face defines a portion of the reaction chamber and the second face defines a portion of the coolant chamber (Fig. 3).

While Lippert et al. discloses the reactor vessel which can be used for various chemical reactions requiring heat transfer to or from reaction chamber, especially for production of hydrogen to be used in fuel cells (P4/L14-33), the reference does not explicitly disclose said reactant supply means comprising means for supplying a hydride solution.

Both, Jung et al. (C1/L64-70, C2/L68-C3/L10) and Amendola et al. (abstract and C4/L62-C5/L4) teach that it is known to produce hydrogen by contacting a hydride solution with catalyst while controlling the temperature at which reaction occurs.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the reactor vessel of Lippert et al. for the purpose of producing hydrogen for fuel cell by reaction of hydride solution in presence of catalyst, as taught by Jung et al. or Amendola et al., by using the supply means for supplying a hydride solution, as doing so would amount to nothing more than use of a known reactor for its intended use in a known environment to accomplish entirely expected result.

17. Claim(s) 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Jung et al. (USP 3,511,710) or

Art Unit: 1764

Amendola et al. (USP 6,534,033), as applied to claim 32 above, in view of Anderson (USP 3,594,557).

Regarding claim 33, Lippert et al. in view of Jung et al. or Amendola et al. disclose all of the claim limitations as set forth above. Additionally the references disclose that it is necessary to control the temperature of the hydride solution (see Jung et al. (C1/L64-70, C2/L68-C3/L10) and Amendola et al. (abstract and C4/L62-C5/L4)).

Lippert et al. in view of Jung et al. or Amendola et al. do not explicitly disclose said control accomplished by control at least one of the temperature and the flow rate of the coolant flow through the coolant chamber. As it is known to control a temperature of chemical reaction apparatus by control at least one of the temperature and the flow rate of the coolant flow (Anderson, C1/L8-28), and further, as the instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any means for controlling the temperature of the reaction chamber of Lippert et al., including by control at least one of the temperature and the flow rate of the coolant flow through the coolant chamber. Said control would amount to use of a known control element for its intended use in a known environment to accomplish entirely expected result.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 1764

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

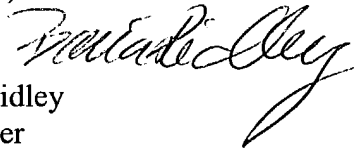
***Conclusion***

19. In view of the foregoing, none of the claims are allowed.
20. The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 1764.
21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453. The examiner can normally be reached on Monday through Thursday, from 9:00 AM to 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

  
Basia Ridley  
Examiner  
Art Unit 1764

BR  
January 26, 2004